

# PATENT SPECIFICATION

(11) 1 421 215

- (21) Application No. 20457/73 (22) Filed 30 April 1973  
 (31) Convention Application Nos. 2 221 931 and 2 221 936  
 (32) Filed 4 May 1972 in  
 (33) Germany (DT)  
 (44) Complete Specification published 14 Jan. 1976  
 (51) INT CL<sup>2</sup> H01R 13/58, 13/36, 17/04  
 (52) Index at acceptance  
 H2E 10B 18 22C 3A4A 3A4E 3B2A 3E15



## (54) A COAXIAL PLUG CONNECTOR

(71) We, SPINNER GMBH ELEKTROTECHNISCHE FABRIK, a German company, of Erzgiessereistrasse 33, 8000 Munchen 2, Federal Republic of Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 The present invention relates to a coaxial plug connector for attachment to coaxial cables.

A previously proposed coaxial plug connector intended for attachment to a cable having an outer conductor or casing corrugated in the manner of a helical screw thread, includes a clamping sleeve, having a corresponding internal screw thread, adapted to be screwed from the front onto the corrugated casing or outer conductor, the adjacent end of which is subsequently crimped onto a tubular nut. In some cases this clamping sleeve also served to make a sealed connection with a plastics outer sheath of the cable.

25 A coaxial cable having a corrugated casing or outer conductor has been produced with a so-called annular corrugation pattern, in which each corrugation is fully annular, rather than helical. In the case of such annularly corrugated cables axial screwing on of a clamping sleeve is not possible.

30 An object of the present invention is to provide a coaxial plug connector which can be fixed in a permanent manner and extremely simply and reliably on to such a coaxial cable.

40 The present invention provides a coaxial plug connector comprising cable attachment means for fixing the connector to a cable, said cable attachment means comprising a clamping sleeve which is internally corrugated to receive a correspondingly corrugated casing or outer conductor of the cable with an end of said corrugated casing or outer conductor resting against a front end annular surface of the clamping sleeve to be clamped axially thereagainst by means of a contact ring, the clamping sleeve being

axially divided into separate parts adapted to be inserted into a body portion of the connector.

The provision of a divided or split clamping sleeve makes it possible to use the cable plug connector of the present invention on both helically corrugated cables and annularly corrugated cables. Thus the divided clamping sleeve may have annular internal corrugations or helical internal corrugations.

In a preferred embodiment of the invention the clamping sleeve abuts axially against a shoulder at one end of a recess in the body portion.

Upon fixing the connector to a cable, the corrugated outer conductor or casing is crimped outwardly to lie against the front end annular surface of the clamping sleeve.

In a further embodiment of the invention the attachment of the plug connector to a cable is simplified by providing the clamping sleeve with a conical end surface which merges smoothly with a corrugated internal surface of the clamping sleeve. By using a suitably shaped contact ring for clamping the end of the corrugated outer conductor or casing the latter is gripped without any separate crimping operation being necessary. It can be arranged that in the case of a cable having annularly corrugated casing or outer conductor an outward deformation or broadening out occurs which is a continuation of the corrugations of the cable outer conductor. Preferably or conveniently, however, in accordance with a further embodiment of the invention, the broadened out part at the end of the outer conductor or casing is not constructed as a continuation of the corrugated shape but instead is conical. Upon axial clamping this conical part acts in conjunction with a suitable conically shaped contact ring to produce the further broadening out of the cable casing or outer conductor which is still necessary in this case.

The invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a side elevation partly in axial

55

60

65

70

75

80

85

90

95

100

section of a plug connector constructed in accordance with one embodiment of the invention attached to an annularly corrugated cable;

5 Figure 2 is a partial axial section, similar to Figure 1, of a plug connector according to another embodiment of the invention, and Figure 3 shows a detail, denoted X in Figure 2, of the connector shown in Figure 2, on an enlarged scale.

10 The same reference numerals are used throughout the drawings to indicate the same or corresponding component parts in the illustrated embodiments.

15 The cable plug connector according to the invention consists of a head 10 extending beyond a connection fitting, and a rear body portion 12 carrying means for fixing the connector to a cable. The body portion 12 has an external screw thread, onto which an internal screw thread of the plug connector head can be screwed with an interposed annular seal 14.

20 The cable has an inner conductor 16, over which an inner conductor contact sleeve 18 of the plug connector head 10 fits. The cable also has a dielectric 20 which is cut back to expose an end portion of the inner conductor 16 and which abuts at its end face against a sleeve 22 of foam material within the head 10. The outer conductor of the cable comprises a casing 24 having annular corrugations which is surrounded by a plastics sheath 26. The plastics sheath 26 surrounding the corrugated casing 24 is cut back so that an end of the sheath 26 is spaced rearwardly from the end of the casing 24. The rear part of the body portion 12 fits around the sheath 26.

25 The plug connector is fixed on the cable by means of a clamping sleeve consisting of two substantially semi-cylindrical half shells 28 having internal annular corrugations, the shape of which corresponds to that of the annular corrugations of the casing 24 surrounding the front end of the casing 24. The half shells 28 are located in a machined out recess of the body portion 12 and abut axially against an annular shoulder 30 at one end of the machined out recess. At their front ends opposite the shoulder 30 the half shells 28 are shaped to define a conical flared part 32 of the clamping sleeve onto which the end of the corrugated cable casing 24 is clamped.

30 The conical outwardly flared part 32 merges smoothly with the corrugated internal surfaces of the shells 28.

35 Instead of forming a conical annular end surface the half shells 28 could be shaped to define a flat annular end surface, perpendicular to the longitudinal axis of the connector, onto which the end of the cable casing would be clamped in an axial direction.

The clamped end of the corrugated casing 24 rests against a contact ring 34, having a shape in axial section conforming to the shape of the adjacent flared part 32 of the clamping sleeve formed by the shells 28. This contact ring 34 is axially supported on an annular shoulder 36 of the head 10 of the plug connector so that by screwing the plug connector head 10 tightly onto the rear body portion 12 an axial contact-making pressure is produced between the contact ring 34 and the corrugated casing 24.

Upon such clamping the end of the casing 24 is deformed outwardly into a conical shape against the flared part 32 and makes good electrical contact with the contact ring 34.

A seal is effected between the corrugated casing 24 and the rear body portion 12 by a sealing composition 38, which is injected or pumped through an opening in the body portion 12 which is subsequently closed by a screw-threaded plug 40.

The plug connector shown in Figures 2 and 3 is similar to that shown in Figure 1, and corresponding component parts, indicated by the same reference numerals as in Figure 1, will not be described further.

In the embodiment of Figures 2 and 3 the annularly corrugated outer casing 24 is cut off in the plane of a corrugation crest by means of a tool 25 shown in broken outline in Figure 3, and the cable dielectric 20 and the inner conductor 16 are also cut off in the same plane. An insulating annular spacer element 22' is interposed between the end of the dielectric 20 and the shoulder 36 while the foam sleeve 22 abuts the spacer element 22'.

In the Figure 2 embodiment a sealing ring 27 effects a seal between the body portion 12 and the sheath 26.

The front ends of the half shells 28 lie in a plane 29, and engage an outwardly flared portion of the casing 24 adjoining the plane of the corrugation crest at which the casing 24 is cut, when the plug connector is screwed up (Figure 2).

#### WHAT WE CLAIM IS:—

1. A coaxial plug connector comprising cable attachment means for fixing the connector to a cable, said cable attachment means comprising a clamping sleeve which is internally corrugated to receive a correspondingly corrugated casing or outer conductor of the cable with an end of said corrugated casing or outer conductor resting against a front end annular surface of the clamping sleeve to be clamped axially thereagainst by means of a contact ring, the clamping sleeve being axially divided into separate parts adapted to be inserted into a body portion of the connector.

2. A coaxial plug connector in accordance

with Claim 1, in which the clamping sleeve consists of two substantially semi-cylindrical shells.

5 3. A coaxial plug connector in accordance with Claim 1 or Claim 2, in which the clamping sleeve abuts axially against a shoulder at one end of a recess in the body portion.

10 4. A coaxial plug connector in accordance with any one of Claims 1 to 3, in which the internal surface of the clamping sleeve is provided with an annular corrugation.

15 5. A coaxial plug connector in accordance with any one of Claims 1 to 4, in which the end surface of the clamping sleeve is conical.

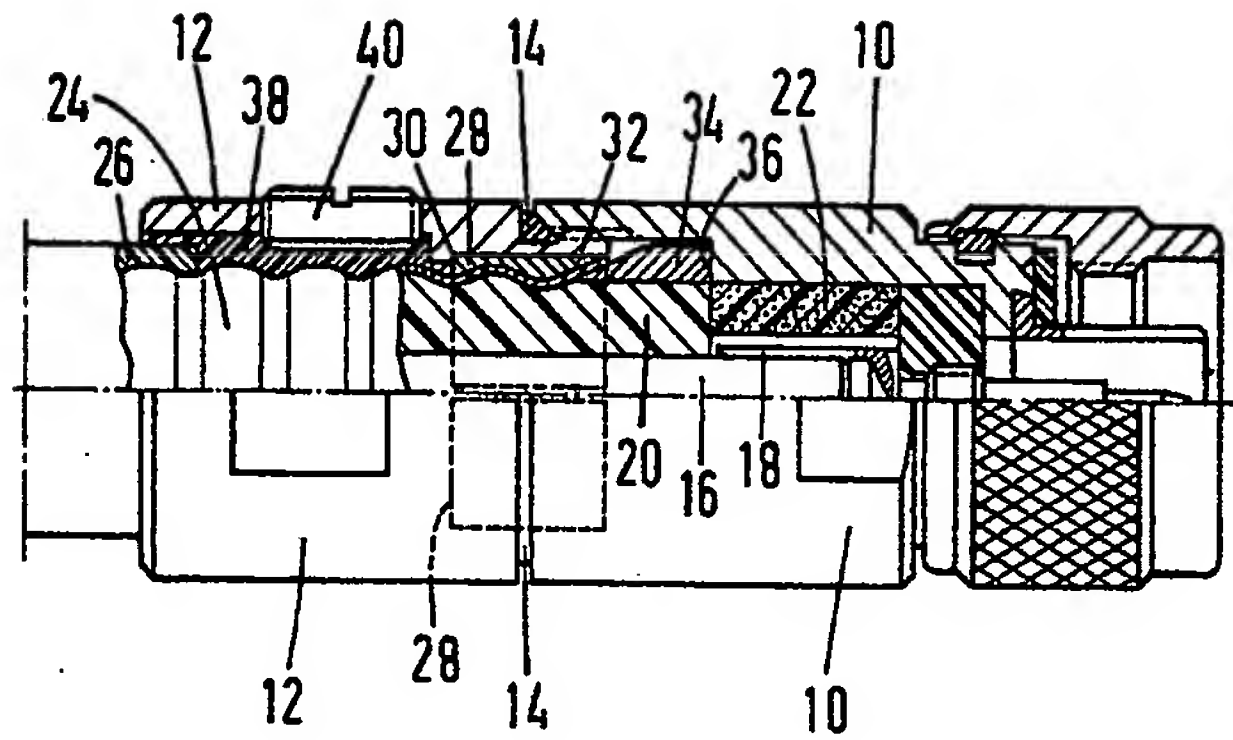
20 6. A coaxial plug connector in accordance with any one of Claims 1 to 4, in which the end surface of the clamping sleeve is an annular face perpendicular to the longitudinal axis of the sleeve.

7. A coaxial plug connector in accordance with Claim 4 and Claim 5, in which the conical end surface of the clamping sleeve merges smoothly with the corrugated internal surface of the clamping sleeve.

25 8. A coaxial plug connector in accordance with Claim 1, substantially as herein described with reference to, and as illustrated in Figure 1 of the accompanying drawings.

30 9. A coaxial plug connector in accordance with Claim 1, substantially as herein described above with reference to, and as illustrated in, Figures 2 and 3 of the accompanying drawings.

35 J. MILLER & CO.,  
Agents for the Applicants,  
Chartered Patent Agents,  
262 High Holborn,  
London WC1V 7EF.



**FIG. 1**

